

which spreading pin extensions 413A extend. The proximal ends of the extensions 413A can be fitted onto spreading pins 413 of FIG. 59. Member 622 is placed on the ledges 626 of backer 620 and spreading pin extensions 413A are inserted through holes 628. Then as shown in FIG. 59, ring 80 is installed with the tines facing distally (downward in FIG. 59). As described hereinbelow "ring 80" and its parts refers to an embodiment of a ring as depicted in FIG. 18. However, any embodiment of the inventive ring may be used with FIG. 59 embodiment of the invention.

[0218] FIG. 61 is the reverse view of FIG. 59. It shows ring 80 with spreading pin extensions 413A passed through the aligned holes through ledge 626, hole 628, and holes in the ring (e.g. holes 83 of FIG. 18). As can be seen in FIG. 61, backer 620 has, on the distal side, a distally-protruding structure 620A. The central ring-shaped portion of ring 80 sits within a recess defined by this structure such that tines 81 are protected by the structure from damage while the ring is retained by the installation tool. The spreading pin extensions 413A (which extend through elements 620 and 622, and through holes in the ring) hold the ring in place primarily by friction. Pin extensions 413A are advanced, retracted, and spread by the force exerted thereon by pins 413 of the reusable portion of the installation tool.

[0219] Note that the combination assembly of ring, backer 620, compliant member 622, and spreading pin extensions 413A may be produced as a separate subassembly and packaged and dispensed for removable mounting at the distal end of a ring installation tool. The entire assembly can be removed from a reusable portion of an installation tool and discarded following a single ring installation. Alternatively, the spreading pin extensions can be omitted, and instead reusable spreading pins (e.g. pins 413) inserted through holes 628 to attach the single-use assembly to a reusable portion of an installation tool. Following installation of a ring, the spreading pins can be sterilized and re-used.

[0220] Another embodiment of this invention relates to loading devices for loading a ring installation tool with anastomosis rings and optionally with anvils.

[0221] One such loading device is shown in FIGS. 62 to 64. This loading device is comprised of a base and block generally indicated as 640 having a recess or cavity 642 in which are located the anastomosis ring 80 and optionally an anvil 60 having an anvil stem 61. Ring 80 is supported on loading pins 644 which protrude from base 640. The pins are situated so as to fit within holes 83 of ring 80 and the number of pins corresponds to the number of such holes. As indicated generally in FIG. 63, loading pins 644 are spring-mounted (on springs 644A). Ring 80 is placed on the pins 644 with tines 81 pointed downward due to the elevation of the loading pins from the bottom of loading base 640. The tines are not in contact with the base. The ring 80 and optionally anvil 60 are loaded via opening 656 onto the distal end of a barrel 650, which may be the distal end of anastomosis installation device such as those illustrated in FIGS. 42 and 48. For proper alignment with the ring, the distal end of barrel 650 has a key 652 which fits into a slot 654 located in the upper portion of the loading base 640 so as to properly align the distal end of the barrel with the ring and/or anvil.

[0222] By using loading device the anastomosis installation tool 650 is lowered onto the loading base 640 using key

652 and slot 654 for alignment. If an anvil is to be loaded, the installation tool or barrel is lowered over the top of stem 61 so that the stem becomes inserted into the barrel or tool through distal opening 656. As the device 650 is lowered onto the ring 80 (as shown in FIG. 64), spreading pins (such as above-described pins 413) become introduced into the holes 83 of the ring, displacing loading pins 644 downwardly as they enter holes 83. The spreading pins engage ring 80 so as to hold it in place at the distal end of element 650 and the anvil stem 61 is engaged by appropriate mechanisms contained within element 650 (for example, those shown in FIG. 49). The ring 80 and anvil 60 are then withdrawn from the loading device 640 and the installation tool is ready for use.

[0223] Another loading device is shown in FIGS. 65 to 67. In this device the anastomosis ring is held above the surface of a loading base by loading pins 664. The device comprises a loading base 660 having loading pins 664 contained within loading pin tubes 662. Anastomosis ring 80 is supported on the loading pins 664 by insertion of the pins 664 through holes in the ring. Mounting of the ring is done so that the ring's tines 81 extend downwardly. Below the ring, a base 660 has a central recess 666. An anvil (not shown) may be contained within this recess opening, as in the loading device shown in FIGS. 62-64.

[0224] As shown in FIG. 66, the anastomosis installation tool 650 is lowered onto the loading device containing the ring. For alignment purposes, the device or barrel may be equipped with a key and a slot similarly to the device shown in FIGS. 62-64. In any event, since the ring is elevated above the recess 666 of loading block 660 the alignment of the ring and anvil with the installation tool can be visually observed and adjusted as necessary. As with the device previously described, spreading pins 413 of the installation tool are lowered onto loading pins 664, thereby displacing pins 664 downward in tubes 662 (pins 664 can be spring loaded within tubes 662) so as to engage ring 80. Likewise, similarly to the device previously described, if an anvil is to be loaded with the ring, it is engaged by a mechanism located within the installation tool. The ring (and optionally the anvil) is then lifted off the loading pins 664 and tubes 662 and the installation tool is utilized to install the ring at an anastomosis site.

[0225] It is understood that while certain forms of the present invention have been illustrated and described herein, the invention is not to be limited to the specific forms or arrangements of parts described and shown or the specific methods described.

What is claimed is:

1. A ring for use in preparing a first organ for anastomosis with a second organ, wherein the first organ has an orifice, and wherein said ring consists of:

a malleable ring portion sized to extend around the orifice; and

docking members and malleable tines that extend out from the ring portion, wherein the tines are movable relative to the ring portion into positions in which said tines can pierce tissue of the first organ around the orifice and, when an anvil has been positioned within the first organ for receiving tips of the tines advancing against the anvil after piercing the tissue around the